

not have personal interaction, and therefore you want to give the best impression possible through your tiny computer camera. I made sure I dressed as if I was going to meet my prospective employer in person. Professional attire has a positive impact and helped to remind me to behave in a polished manner – I've found it too easy to drop the professionalism in front of a webcam, because you don't feel the same social pressure you might in a face-to-face interview. Dress well from top to bottom and do not rely on the fact that the camera shows only your upper body. You might need to stand up or walk with your laptop from one room to another, as I did.

Communicate clearly. When I faced connection problems during my conversations and seminar, I tried to explain in a calm and timely manner. I had a mobile phone on hand, and had exchanged numbers with the meeting administrator in case I needed to troubleshoot problems. I tried to pause at appropriate points during my seminar, to make sure everyone was following and connected. In one of the sessions, I was talking to two faculty members who could see me and each other, but I could not see them owing to a software glitch. I made sure to check they were still available, and let them know that I could only hear them. There were other clumsy moments – often it felt like

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a choice between interrupting an interviewer or letting dead silence fill the air for a moment. In these moments, I made sure to keep a big smile on my face and talked only after the other side had completely finished and paused for couple of seconds.

Before I accept a job offer, I hope I will eventually be able to visit the facilities and lab space in-person – an important consideration that can't be solved by videoconferencing. But overall, I found online interviewing much less tiring and stressful than onsite visits. I had many more opportunities to rest outside individual meetings, which I wouldn't have had in the 'real world'. And I had none of the travel commitments that might have been burdensome before lockdown.

Be prepared to be told that your potential employer will not be hiring until COVID-19 loosens its grip. Be patient, positive and understanding. Remember that this is a difficult time for everyone – and your potential employers will probably do the same for you.

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REPRODUCIBILITY AND MENTAL HEALTH

An inability to focus forced an exploration of what drives mental welfare. **By Jeff C. Clements**

On a cloudy October afternoon in 2015, I set off to drive to my partner's home. I was living apart from her while finishing my PhD. The drive through New Brunswick, Canada, was long and boring, but I made a point of going every weekend.

I don't remember much until I pulled up to a toll gate in the next province, nearly two hours past my destination – I had driven for three hours and didn't remember any of it.

I was suffering from an acute bout of imposter-syndrome-driven depression and anxiety, which lasted for about four weeks. Absentmindedness and an inability to focus were at the less-severe end of my symptom list.

A campus mental-health professional helped me to realize that my depression was driven, at least in part, by repeated manuscript rejection and harsh reviewer comments related to an experiment I earlier in my PhD. To address this, my supervisor hired an undergraduate student to help me replicate the experiment. Confirmation of my previous results, along with a wonderful support system outside work, turned my well-being around. For me, replicable scientific results and mental health were linked.

Successful replication, was able to alleviate my depression. But what might have happened had I been unable to reproduce my findings? And what might be happening to other early-career researchers who are unable to reproduce their own or others' results? It is no secret that many scientific disciplines have low rates of reproducibility, often dubbed the reproducibility crisis (see *Nature* 533, 452–454; 2016). It is also apparent that early-career researchers – who often do cutting-edge science – have an extremely high prevalence of mental illness^{1,2}.

Testing the theory

This remained in my thoughts when I arrived in Trondheim, Norway, to begin a new postdoc in 2018. My supervisor, Fredrik Jutfelt, frequently mentioned that he was often unable to reproduce clear results from the literature. We wanted to know how common it might be for an inability to reproduce results to affect the mental well-being of early-career researchers. We conducted a Twitter poll (see go.nature.com/3dtta54); 40% of the 53 respondents said that irreproducibility played at least some part in their mental-health problems or imposter syndrome during their graduate studies.

Although there are limits to anonymous online surveys such as this, I know from experience that failing to reproduce results can cause extreme stress, because students often interpret it as a reflection of their own ability.

So, what can we do? For me, knowing that a failure to replicate is not an indicator of my ability as a researcher was crucial. If I had known that it did not mean that I was incompetent, it might have helped me to avoid that dark period of depression during my PhD – or at least to overcome it more quickly. In fact, inability to replicate results is more than OK – it is common, and often correct. Initial studies might have poor methodologies, a lack of transparency and a wealth of biases³. Having understanding supervisors throughout my career – people who recognize irreproducibility as a healthy part of science – has helped to shape the way I think about it.

A cultural acknowledgement in science that negative results aren't a bad thing would have helped me. I feel that direct training on how to recognize and produce transparent and reproducible research (from experimental design through to publication) would have helped to alleviate my stress and improve my mental well-being. In my experience, such training is not common, but it would be worth developing. Discussions of the importance of publishing negative and null results would also help.

It is crucial that we address reproducibility if we are to eliminate the proliferation of false positives in scientific discovery. Science must also improve the dismal mental well-being of its workforce. I'm not aware of any studies that investigate the direct effect of reproducibility on mental health, but I would welcome one: I suspect I'm not alone in my experience of one issue affecting the other. Issues in reproducibility must be addressed, not just for the well-being of science as a process, but also for the well-being of scientists as people.

Jeff C. Clements recently completed a Marie Skłodowska-Curie postdoctoral fellowship at the Norwegian University of Science and Technology, and now works as a research scientist for Fisheries and Oceans Canada.

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